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SYMPTOM SEVERITY, AMOUNT OF TREATMENT, AND 1-YEAR OUTCOMES AMONG DUAL DIAGNOSIS PATIENTS

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ABSTRACT: This study reports on associations among symptom severity, amount of treatment, and 1-year outcomes in a national sample of 8,622 dual diagnosis patients, who were classified at treatment entry into low-, moderate-, and high-severity groups. Patients with more severe symptoms at intake had poorer 1-year outcomes. Higher severity patients did not receive adequate "doses" of care: Compared with low-severity patients, they had a shorter duration of care, although a longer duration was associated with improved outcomes; they also were less likely to receive outpatient substance abuse treatment, although more intensive treatment was associated with better drug outcomes. High-severity patients improved more on drug and legal outcomes, but less on psychiatric and family/social outcomes, than low-severity patients did when treatment was of longer duration or higher intensity. Dual diagnosis patients with highly severe symptoms would likely benefit from a longer episode of care that includes substance abuse and psychiatric outpatient treatment.

KEY WORDS: dual diagnosis; functioning outcomes; substance use outcomes; symptom severity; treatment duration and intensity.

The focus on how best to treat dual diagnosis patients has grown in recent years due to increasing numbers of patients having both substance use and psychiatric disorders (Drake, Mercer-McFadden, Mueser, McHugo, & Bond, 1998; Kasprow, Rosenheck, Frisman, & DiLella, 1999). In part,

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as an effort to improve services for dual diagnosis patients, the Department of Veterans Affairs (VA) instituted a nationwide evaluation of the process and outcome of care for patients with substance-use disorders, more than 60% of whom also have psychiatric diagnoses (Moos et al., 1998). This study reports on associations among the severity of symptoms, the amount of treatment, and 1-year outcomes in a sample of dual diagnosis patients assessed in the VA's nationwide outcomes monitoring program.

In the context of improving services for dual diagnosis patients, one question is this: To what extent is the severity of patients' problems, as they enter treatment, associated with how much they improve? In this regard, studies have found that substance abuse patients with more severe psychiatric symptoms have a poorer clinical response to treatment than do patients with less psychopathology (Alterman & Cacciola, 1991; Gerstley, Alterman, McLellan, & Woody, 1990; Rounsaville, Kosten, Weissman, & Kleber, 1986).

To what extent is the severity of patients' problems, as they enter treatment, associated with how much they improve?

These findings lead to a second question: Do dual diagnosis patients with more severe symptoms receive adequate "doses" of services for their problems? It might be expected that patients with more severe substance use and psychiatric disorders receive more substance abuse and psychiatric services than do patients with less severe symptoms. In fact, Alterman, McLellan, and Shifman (1993) found that substance-use-disorder patients with more severe psychiatric symptoms received more services targeted to their alcohol, psychiatric, and family/social problems. Lehman, Myers, Johnson, and Dixon (1995) found that dual diagnosis inpatients with more severe psychiatric disorders were more likely to obtain follow-up psychiatric care in the post-discharge year than were patients with less severe psychiatric disorders. However, these patients were less likely to obtain follow-up substance abuse treatment.

Another commonly asked question is this: To what extent does more treatment result in benefits for dual diagnosis patients? In fact, dual diagnosis patients who receive enhanced services have better casemix-adjusted clinical outcomes. In the Alterman and coworkers (1993) study, patients who received more treatment showed more improvement at a 7-month follow-up. Similarly, a study of dually diagnosed women by Brown, Melchior, and Huba (1999) found that longer lengths of stay were associated with positive outcomes (e.g., abstinence; having a safe place to live; and plans for employment, school, or training). A 1-year follow-up of dual diag-

nosis inpatients reported better outcomes for patients who participated in continuing specialized outpatient mental health care than for those who did not obtain such care (Ouimette, Finney, & Moos, 1997).

Moos, Finney, Federman, and Suchinsky (2000), using the overall group of dual diagnosis patients from which we sampled here, found that longer episodes of care were associated with better risk-adjusted outcomes. For example, only 45% of dual diagnosis patients who had 1 to 6 months of treatment were abstinent at follow-up, and only 53% were free of substance-use problems; whereas this was true of 64% and 70%, respectively, of patients who had at least 12 months of treatment. A total of 12% of dual diagnosis patients treated for 1 to 6 months had legal problems (i.e., were awaiting trial or were in jail) versus 4% of patients treated for at least 12 months. Among dual diagnosis patients, there was also an association between more intensive outpatient mental health care (i.e., more sessions per month) and better psychiatric and family outcomes. These analyses did not consider the severity of patients' substance abuse and psychiatric symptoms when they enter treatment, which is our focus here.

In addition to research results suggesting that more treatment is generally beneficial for dual diagnosis patients, studies demonstrate the heterogeneity of dually diagnosed individuals (Luke, Mowbray, Klump, Herman, & BootsMiller, 1999) such that patients who differ in severity also differ in the domains on which they improve during treatment. For example, Moggi, Ouimette, Finney, and Moos (1999) found that dual diagnosis inpatients with milder psychiatric symptoms improved at 1-year post-discharge on both substance-use and psychiatric outcomes. In contrast, patients with more severe psychiatric symptoms improved only on substance-use measures, and not on psychiatric symptoms. Similarly, compared with dually diagnosed patients, the duration of care was more closely associated with improvements in psychiatric symptoms and family problems among patients with only substance use disorders (Moos et al., 2000).

To what extent does more treatment result in benefits for dual diagnosis patients?

Treatment outcomes across different domains depend not only on patient severity but also on the interaction of patient severity by the amount of treatment obtained. This was shown in a prospective study that matched substance-dependent veterans having mild psychiatric problems with lower intensity programs, while those with more severe problems were matched with higher intensity programs. Compared with mismatched patients (i.e., low-severity patients in high-intensity programs, and high-severity patients in low-intensity programs), matched patients had better outcomes at a 6-

month follow-up in the drug and legal domains, but the benefits of matching were less apparent in the alcohol and psychiatric domains (McLellan, Woody, Luborsky, O'Brien, & Druley, 1983). Moos, Schaefer, Andrassy, and Moos (2001) found that a longer duration of outpatient care and more self-help participation were more strongly associated with residential stability among dual diagnosis patients with more severe psychiatric disorders than among patients with less severe disorders. This result supports the idea that patients with more severe problems get more benefit from more treatment in particular outcome domains. Research findings on dose-response relationships in psychotherapy indicating that disorder-specific symptoms improve before functional status (Barkham et al., 1996; Howard, Lueger, Maling, & Martinovich, 1993) suggest that severely ill patients, especially, may need extended periods of treatment to achieve better psychological-emotional and family/social functioning.

Using a VA nationwide sample of substance abuse patients with psychiatric disorders, we examined four questions: (1) Do dual diagnosis patients who have more severe symptoms at baseline experience less improvement at a 1-year follow-up? (2) Do dual diagnosis patients with more severe symptoms receive more treatment? (3) What is the association between the duration and intensity of outpatient specialty treatment and casemix-adjusted outcomes? (4) Does the severity of a patient's symptoms interact with the duration and/or intensity of outpatient treatment to influence outcomes?

METHOD

As a step toward a nationwide evaluation of the process and outcome of care for patients with substance-use disorders, the VA mandated that clinicians systemwide use the Addiction Severity Index (ASI; McLellan et al., 1992) to assess all such patients at entry into treatment and at a 9- to 12-month follow-up. Here, we report on dual diagnosis patients included in the first cohort of patients in this nationwide outcomes monitoring program.

Addiction Severity Index

The VA organized a nationwide program to train staff members to conduct Addiction Severity Index (ASI) interviews in a consistent and reliable way (Moos et al., 2000). The ASI is a structured clinical research interview that assesses current problems in seven domains, of which five are used here: alcohol, drug, legal, psychiatric, and family/social. In each domain, clinicians provide 10-point (0–9) *severity ratings* that can be used for initial treatment planning and referral. These severity ratings provide valid,

reliable (i.e., consistent across testing occasions and raters), and clinically useful estimates of problem severity (McLellan et al., 1985; McLellan, Luborsky, Woody, & O'Brien, 1980; Stoffelmayr, Mavis, & Kasim, 1994). In addition, in each area, a *composite score* that ranges from 0 to 1 is produced from a set of objective items (i.e., a patient's responses about the number, extent, and duration of problems in the past 30 days) that are standardized and summed; they provide internally consistent evaluations of patient status in the problem areas (McKay, Alterman, McLellan, & Snider, 1994).

Patients

In the first phase of the outcomes monitoring program, a total of 22,429 patients in VA facilities completed a baseline ASI assessment, and they were rated by clinicians on the severity of their disorders. A follow-up was conducted by a combination of in-person and mailed self-report procedures. A total of 14,275 of these patients completed a follow-up ASI, which is 65.6% of the 21,769 patients who were still alive (660 patients had died). The average length of time between the baseline and follow-up ASI was 12.8 months. In general, the followed patients' demographic and diagnostic characteristics were comparable to those of the overall sample of patients from which they were drawn (Moos et al., 1998; Moos, Humphreys, Ouimette, & Finney, 1999).

Diagnoses were obtained in regular clinical intake interviews. Fully 60.4% (*N*=8,622) of the patients had one or more psychiatric diagnoses in addition to their substance-use-disorder diagnosis. Of the dual diagnosis patients, 61.3% had multiple psychiatric disorders, and 38.7% had a single psychiatric disorder; the most common disorder was depression (64%), followed by anxiety (55%), psychotic disorder (24%), personality disorder (21%), schizophrenia (21%), and other psychiatric disorders (28%).

On average, these patients were 46.6 years of age (*SD*=8.3) and had 12.7 years of education (*SD*=2.1). A total of 96% were men; 57% were Caucasian, 35% were African American, 6% were Hispanic/Latino, and 2% were of other racial groups. Only 22% of the patients were currently married, and 36% had stable employment. Fully 86% had some religious affiliation (mainly Protestant or Catholic), and 88% had a stable residence; on average, patients had lived 5.4 years (*SD*=9.3) at their present address. These dual diagnosis patients had been previously hospitalized an average of 4.7 times (*SD*=5.7).

Severity Groups

Classification of the dual diagnosis patients into three severity groups (low, moderate, and high) was based on ASI severity ratings. In the first step to classify patients into groups, the mean of the ASI severity ratings for the alcohol and drug-use domains was calculated to create a substance-

use severity rating score. Then, on both the substance-use and the psychiatric ratings, scores represented low (0–2), moderate (3–5), or high (6–9) severity.

Patients were classified as *low severity* if both the substance-use and psychiatric ratings were low, or if one of these ratings was low and the other was moderate (N=2,457; 29%). Patients were classified as *moderate severity* if both the substance-use and psychiatric ratings were moderate, or if one of these ratings was high and the other was low (N=2,442; 28%). Patients were classified as *high severity* if both the substance-use and psychiatric ratings were high, or if one of these ratings was high and the other was moderate (N=3,723; 43%).

To check the validity of the classification of patients for placement in the low-, moderate-, and high-severity groups, we conducted one-way ANOVAs followed by Scheffé tests on each of the baseline ASI composite scores. On each of the five composite scores used here, the high-severity group had poorer functioning than the moderate-severity group, which in turn had poorer functioning than the low-severity group (p<.001).

Service Episodes

Using information from VA nationwide inpatient and outpatient health care utilization databases for Fiscal Years 1997 and 1998, Moos and associates (2000) specified an index episode of care for each patient. In addition, they used the nationwide files to determine the characteristics of the specialty mental health treatment that patients received.

Specifically, Moos and associates (2000) defined an index episode of care as beginning with the first day of treatment that a patient received after an interval of 30 days or more without treatment. The end of the index episode was defined as the last day of care that was followed by a minimum of 30 days without any care, or, for outpatients, by a new episode of inpatient care. To specify the index episode, Moos and associates used the dates of mental health care in which the patient had a substance-use and psychiatric diagnosis. More specifically, they chose the episode of mental health care in which, or closest to which, the patient completed the baseline ASI. The goal was to characterize service episodes in terms of their duration and the overall amount of mental health treatment that patients received.

RESULTS

First, we conducted analyses of covariance (ANCOVAs) to examine associations between severity group (low, moderate, high) and 1-year ASI composites, on which higher scores represent poorer outcomes. These

ANCOVAs controlled for the baseline composite score of the outcome under consideration.

Next, we used chi-square analyses to examine associations between severity group and the likelihood of receiving different types of care. An analysis of variance (ANOVA) was conducted to compare patients in the severity groups on the duration of index treatment episode. We used ANCOVAs to examine associations between severity group and amounts of services received (e.g., number of days on a substance abuse [or psychiatric] inpatient or extended-care unit, number of outpatient substance-abuse or psychiatric visits). As explained below, these analyses controlled for the duration of the index treatment episode.

We conducted ANCOVAs that entered patient severity (low, moderate, high), the duration of the index treatment episode (coded as <1 to 6 months, >6 to <12 months, or 12 or more months; Moos et al., 2000), and the interaction of severity by duration as independent variables. The dependent variables were the 1-year ASI composites, and the covariate was the baseline value of the ASI composite under consideration. These analyses enabled us to examine associations between duration of the treatment episode and patients' outcomes.

Finally, we conducted ANCOVAs that entered patient severity, the intensity of outpatient substance-abuse or psychiatric treatment (coded as low, medium, high), and the interaction of severity by intensity of treatment as independent variables. The dependent variables were again the 1-year ASI composites, and the covariates were (a) the baseline value of the ASI composite under consideration and (b) the duration of the index treatment episode. These analyses enabled us to examine associations between the intensity of outpatient specialty care received and the patients' outcomes (the dependent variable). For these analyses, the distribution on each variable assessing the number of outpatient substance abuse or psychiatric visits was used to classify the low, medium, and high amounts of that type of treatment. Each ANCOVA used only individuals who received the type of treatment under consideration. These analyses also enabled us to look for interactions between patient severity and the intensity of outpatient treatment.

Severity and Improvement

To focus on whether there was an association between severity and patients' outcomes, we conducted ANCOVAs to examine the effect of severity group on the 1-year ASI composite scores, controlling for the baseline value of the composite under consideration. When the effect for severity was significant, MANCOVAs were conducted to compare group means. The results are presented in Table 1; lower composite scores indicate better outcomes. High-severity patients improved less than did low-severity

TABLE 1
Adjusted Means of Low-, Moderate-, and High-Severity Patients on Addiction Severity Index Composite Scores at Follow-up

	Severity Group at Baseline			
ASI Composite at Follow-up	*Low Mean*	*Moderate Mean*	*High Mean*	F^1
Alcohol	.196[a]	.208	.216[a]	4.65*
Drug	.090	.090	.089	0.18
Legal	.041[ab]	.054[a]	.062[b]	14.99**
Psychiatric	.347[ab]	.372[a]	.383[b]	15.58**
Family/Social	.155[ab]	.185[a]	.192[b]	29.50**

[1]Each ANCOVA controlled for the baseline value of the composite. Mean values that share a superscript differ significantly at $p<.05$ (such as .041[a] and .054[a]; or .041[b] and .062[b]).
*$p<.01$. **$p<.001$.

patients on the alcohol composite. High- and moderate-severity patients improved less than did low-severity patients on the legal, psychiatric, and family/social composites.

Severity and Treatment

We used chi-square analyses to examine whether patients with more severe problems were more likely to receive different types of care. As shown in Table 2, higher severity was related to a greater likelihood of receiving inpatient care on a substance-abuse unit, psychiatric unit, or mental health (i.e., substance abuse and/or psychiatric care combined) unit. Patients were classified as having received outpatient substance abuse or psychiatric care if they had at least three visits of that type; this was done because the first two visits for specialty care tend to focus more on assessment and diagnosis than on treatment (Moos et al., 2000). To be specific, a *substance-abuse visit* referred to a patient's individual or group session at a specialty substance-abuse clinic, and a *psychiatric visit* referred to an individual or group session at a specialized psychiatric clinic. In addition to assessment and diagnosis, these visits included individual or group counseling and psychotherapy, stress management, social skills and coping skills training, relapse prevention training, and medication monitoring, for example. Table 2 shows that moderate- and high-severity patients were more likely than low-severity patients to receive outpatient psychiatric care, but less likely to receive outpatient substance abuse or mental health care.

TABLE 2
Percentages of Low-, Moderate-, and High-Severity Patients Receiving Services During Index Treatment Episode

	Severity Group at Baseline			
Service	*Low* %	*Moderate* %	*High* %	χ^2
Admission to Unit				
Substance abuse unit and/or extended-care unit for substance abuse problem	43.8	45.9	50.0	13.18***
Psychiatric unit and/or extended-care unit for psychiatric problem	37.7	46.0	53.9	79.83***
Mental health unit and/or extended-care unit for mental health problem	73.3	81.3	87.7	104.21***
Outpatient Care				
Substance abuse care	78.7	73.5	73.4	26.31**
Psychiatric care	52.8	58.4	59.7	30.46**
Mental health care	89.4	87.4	86.8	9.92*

*$p<.05$. **$p<.01$. ***$p<.001$.

An ANOVA followed by a Scheffé test to compare group means showed that low-severity patients had a significantly longer index episode of treatment (M=9.54 months) than did moderate-severity patients (M=7.39 months), who in turn had a significantly longer episode than did high-severity patients (M=6.48 months; F=129.87, $p<.001$). Accordingly, when we examined associations between level of severity and amounts of treatments received, we conducted ANCOVAs that controlled for the duration of the index episode. Results are presented in Table 3.

In analyses of inpatient and/or extended care, high-severity patients had the longest length of stay when specialty substance-abuse and psychiatric care were considered separately or combined (i.e., as mental health care). In addition, high-severity patients had more outpatient substance-abuse visits than did low- or moderate-severity patients. Regarding the total number of outpatient mental health visits—that is, all substance-abuse and psychiatric visits combined—both moderate- and high-severity patients were higher on this index than were low-severity patients.

TABLE 3
Adjusted Means of Low-, Moderate-, and High-Severity Patients on Amounts of Services

	Severity Group at Baseline			
	Low Mean	*Moderate Mean*	*High Mean*	F^1
Number of Days in Inpatient and/or Extended Care				
Substance abuse	13.87[a]	16.72[b]	20.21[ab]	10.56*
Psychiatric	10.03[ab]	14.88[a]	15.95[b]	9.29*
Mental health	23.90[a]	31.60[a]	36.15[a]	20.45*
Number of Outpatient Visits				
Substance abuse	37.95[a]	41.62[b]	45.97[ab]	12.22*
Psychiatric	11.35	13.01	13.09	2.11
Mental health	49.30[ab]	54.64[a]	59.06[b]	13.91*

[1]Each ANCOVA controlled for length of the index treatment episode. Mean values that share a superscript differ significantly at $p<.05$ (such as 13.87[a] and 20.21[a]; or 16.72[b] and 20.21[b]).
*$p<.001$.

Treatment Duration and Outcomes

We examined associations between the duration of the index episode of care and patients' 1-year outcomes with ANCOVAs that controlled for the baseline value of the outcome under consideration. The results, presented in Table 4, show that longer index episodes of care were associated with better alcohol, legal, psychiatric, and family/social outcomes. In contrast to index episode length, the longer inpatient/extended-care substance abuse, psychiatric, or mental health stays were not related to improved alcohol, drug, legal, psychiatric, or family/social composite scores (not shown in Table 4) in ANCOVAs that controlled for the baseline value of the corresponding composite.

With ANCOVAs we also examined interactions of severity by duration of the index episode on the ASI composites at follow-up. The covariate was the baseline value of the outcome under consideration. Of the interactions examined, four were significant ($p<.01$). When the interactions were plotted, they fell into two patterns according to outcome domain.

The first pattern held for patients' drug and legal outcomes. For example, Figure 1 depicts the interaction of patients' symptom severity by duration of the index episode of care on the ASI legal composite scores at 1 year. When the duration of the index episode was shorter (<1 to 6

TABLE 4
Adjusted Means of Length-of-Index-Episode Groups on Addiction Severity Index Composite Scores at Follow-Up

	Length of Index Episode			
	0–6 Months	*6–12 Months*	*12+ Months*	
ASI Composite at Follow-up	*Mean*	*Mean*	*Mean*	*F*[1]
Alcohol	.236[a]	.208[a]	.160[a]	70.84*
Drug	.089	.089	.096	2.75
Legal	.064[ab]	.047[a]	.037[b]	25.51*
Psychiatric	.385[a]	.376	.361[a]	8.23*
Family/Social	.188[a]	.180[b]	.165[ab]	11.49*

[1]Each ANCOVA controlled for the baseline value of the composite. Mean values that share a superscript differ significantly at $p<.05$ (such as .064[a] and .047[a]; or .064[b] and .037[b]).
*$p<.001$

months), moderate- and high-severity patients had substantially poorer legal outcomes than did low-severity patients. However, moderate-severity, and especially high-severity, patients improved more than low-severity patients did on legal outcomes as the duration of the index episode increased. Low-, moderate-, and high-severity patients were more similar on legal outcomes when the duration of the index episode was 12 months or more, but low-severity patients still had better legal outcomes than the moderate- and high-severity groups.

The second pattern held for patients' family/social and psychiatric outcomes. Figure 2 portrays the interaction of patients' symptom severity by duration of the index episode of care on the ASI psychiatric scores at 1 year. Moderate- and high-severity patients had poorer psychiatric functioning than low-severity patients did when the duration of the index episode was limited to 6 months or less. In this case, moderate- and high-severity patients improved less than low-severity patients did when the duration of the index episode was extended; thus, when the episode was 12 months or more, low-severity patients were considerably better off on psychiatric outcomes.

Intensity of Outpatient Care and Outcomes

We also examined associations between the intensity of outpatient treatment received and patients' casemix-adjusted outcomes. The only significant effects of treatment intensity were on the 1-year drug composite. Spe-

FIGURE 1
Interaction of Severity of Patients' Symptoms by Length of Index Episode on 1-Year Legal Outcomes

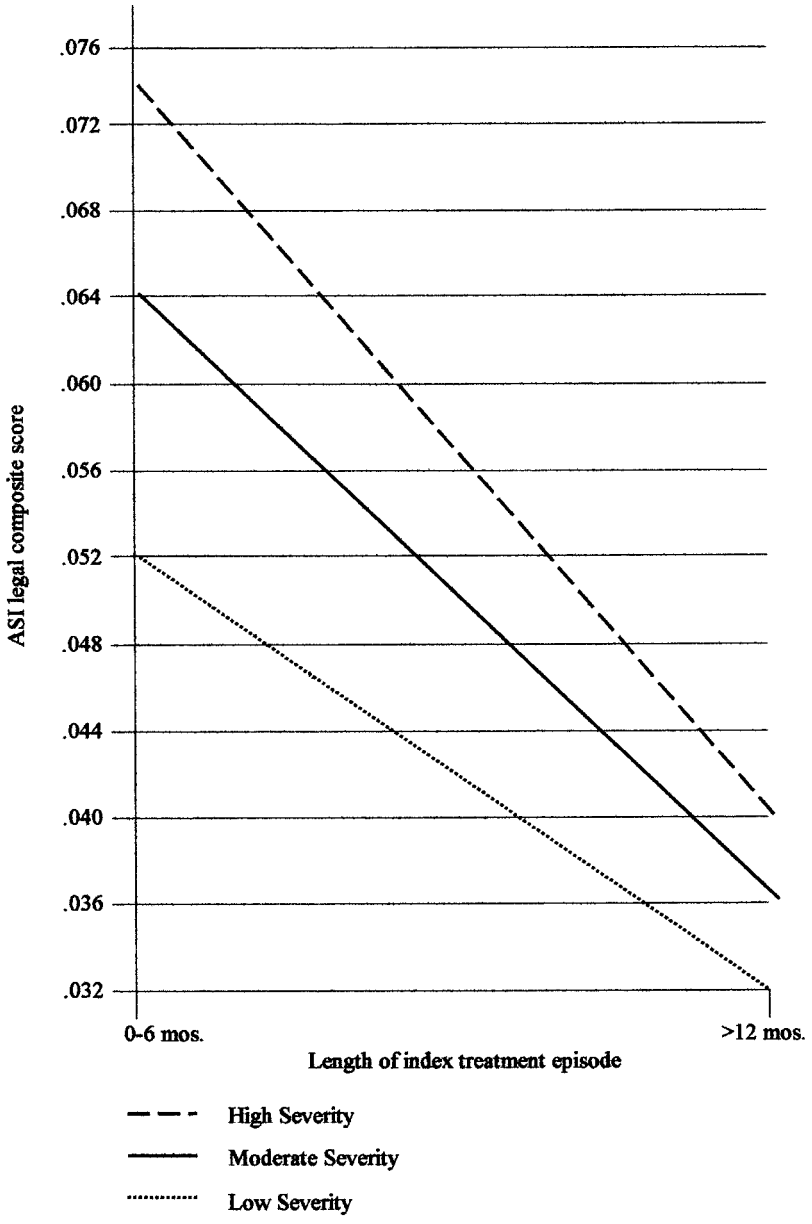
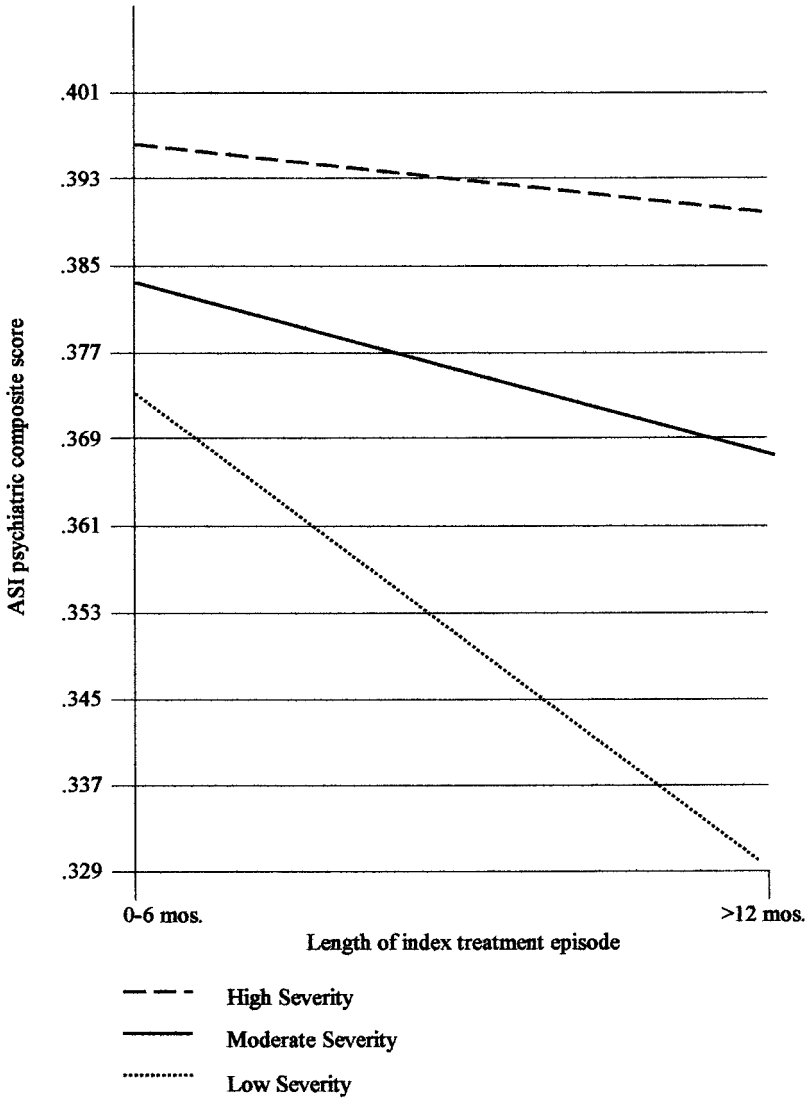


FIGURE 2
Interaction of Severity of Patients' Symptoms by Length of Index Episode on 1-Year Psychiatric Outcomes



cifically, patients with more intensive outpatient substance-abuse care had better drug outcomes (M=.078) than did patients with a moderate (M=.093) or low (M=.098) intensity of this care (F=13.62, p<.001). In addition, patients with more intensive outpatient psychiatric care had better drug outcomes (M=.076) than did patients with a low (M=.087) intensity

of such care (F=4.83, p<.01). Patients with more intensive outpatient mental health care had better drug outcomes (M=.077) than did patients with a moderate (M=.093) or low (M=.097) intensity of such care (F=16.39, p<.001).

As described earlier, with these ANCOVAs we examined interactions of severity by intensity of outpatient treatment on the ASI composite scores at follow-up. Of the 15 interactions examined, 11 were significant (p<.05); no interactions were significant in the alcohol domain. When the significant interactions were plotted, they fell into the two patterns shown in Figures 1 and 2 according to outcome domain. The pattern shown in Figure 1 held when the amount of outpatient substance abuse, psychiatric, or mental health care was examined in relation to patients' drug or legal outcomes. That is, as the intensity of treatment increased, higher severity patients improved more than low-severity patients did on drug and legal outcomes. The second interaction pattern, in Figure 2, held when the amount of outpatient substance abuse, psychiatric, or mental health care was examined in relation to patients' family/social outcomes, and when the amount of outpatient substance-abuse or mental health care was considered in relation to patients' psychiatric outcomes. That is, when treatment was more intensive, higher severity patients improved less than low-severity patients did on family/social and psychiatric outcomes.

DISCUSSION

Dual diagnosis patients who had more severe symptoms at intake had poorer outcomes at the 1-year follow-up in the alcohol, legal, psychiatric, and family/social domains than did patients with less severe symptoms. This finding is consistent with those of previous studies (Alterman & Cacciola, 1991; Gerstley et al., 1990; Rounsaville et al., 1986). Our results suggest that higher severity patients had poorer outcomes because they did not receive adequate "doses" of continuing outpatient mental health care.

Severity, Treatment, and Outcomes

An indicator that high-severity patients were "under-dosed" was that the index treatment episode among patients with more severe symptoms was of shorter duration than that of patients with less severe symptoms. Specifically, on average, high-severity patients received treatment for a period 2 months shorter than the period of treatment for low-severity patients. The association of higher severity with a shorter treatment episode must be examined in the context of evidence from this and other studies, which indicates that a longer duration of care does benefit dual diagnosis pa-

tients. We found that a longer treatment duration was associated with better alcohol, legal, psychiatric, and family/social outcomes at the 1-year follow-up. Other studies of mixed samples of substance-use-disorder-only patients and dual diagnosis patients also reported positive relationships between duration of mental health care and better risk-adjusted substance use, legal, and family-problem outcomes (Moos et al., 2001; Ouimette et al., 1997).

Higher severity patients had poorer outcomes because they did not receive adequate "doses" of continuing outpatient mental health care.

In addition to having a shorter duration of care, patients with more severe symptoms were less likely than patients with milder symptoms to receive outpatient substance abuse treatment. This finding is consistent with a report by Lehman and colleagues (1995) that more severely ill dual diagnosis patients received less substance abuse follow-up care. Again, findings that higher severity dual diagnosis patients are less likely to obtain follow-up substance abuse treatment should be considered in light of our finding that more intensive outpatient substance abuse care was associated with better drug outcomes. This study (in which longer treatment duration was associated with outcomes in several domains, and more intensive outpatient specialty treatment was associated with drug outcomes only) supports the conclusion of other authors that duration may be a more robust predictor of outcomes than intensity (Fontana & Rosenheck, 1996; Moos et al., 2000).

Matching Patients to Treatment

Although severely ill patients received less-than-desirable amounts of treatment, there were indications of some matching of patients to treatments based on severity of symptoms. For example, among patients who did receive outpatient substance abuse treatment, on average, more severely ill patients had a greater number of visits. On the other hand, among patients who received outpatient psychiatric care, high-severity patients were equivalent to low-severity patients on average number of visits. Even in the study by Alterman and coworkers (1993), in which patients with more severe psychiatric symptoms received more psychiatric services, the variation in services that was explained by intake psychiatric scores was quite modest. Together, these findings highlight the need for a better understanding of the clinical and sociodemographic characteristics of patients that determine the quantity and pattern of services they obtain.

One of these characteristics may be psychiatric diagnoses. Dual diagnosis patients have a range of psychiatric disorders, from psychotic to person-

ality disorders, and varied combinations of problems. That is, even patients within a single symptom-severity grouping are likely to form a somewhat heterogeneous cluster. Distinct psychiatric categories may differentially influence treatment experiences and outcomes (Ouimette, Gima, Moos, & Finney, 1999).

Patients with more severe symptoms were more likely to receive inpatient care than were patients with less severe symptoms. This result held for substance abuse, psychiatric, and mental health inpatient and/or extended care. In addition, among patients who received inpatient care, those with more severe symptoms had longer lengths of stay in substance-abuse and psychiatric units. There is consensus in the literature that inpatient placements are appropriate for patients with more chronic and complex disorders, and that patients with more serious problems need longer inpatient stays (Gastfriend & McLellan, 1997; Gordon & Gordon, 1987; Rabinowitz, Massad, & Fennig, 1995; Rabinowitz et al., 1995; Tucker, Bauer, Wagner, Harlam, & Sher, 1987; Turner, Turner, Reif, Gutowski, & Gastfriend, 1999). However, longer inpatient stays were not related to greater improvement in any substance abuse, legal, or life-functioning domain, suggesting that extended hospitalizations are not adequate to meet the needs of patients. Rather, consistent with our findings here, the patients benefit in terms of substance-use and psychiatric outcomes and reduced readmission rates when, after an episode of acute inpatient care, they obtain continuing outpatient specialty care (Huff, 2000; Ito & Donovan, 1990).

Severity by Treatment Interactions

A longer duration of treatment and more intensive outpatient substance-abuse or psychiatric care were associated with better outcomes overall in this dual diagnosis patient sample. In addition, severity of symptoms interacted with duration and intensity to influence outcomes. One finding showed that the association of extended duration or greater intensity with better drug and legal outcomes was stronger among patients with more severe symptoms. This is consistent with the finding of Moos and associates (2001) that a longer duration of care was more strongly associated with residential stability among more severely ill dual diagnosis patients since drug addiction, legal difficulties, and homelessness often occur together (Drake et al., 1998). We also found that the link of duration and intensity to better family/social and psychiatric outcomes was stronger among patients with less severe symptoms. Similarly, Moos and associates (2000) found that duration was more closely associated with a decline in psychiatric symptoms and family problems among patients who were clinically diagnosed as having only substance-use disorders than among pa-

tients who were diagnosed with co-morbid substance-use and psychiatric disorders.

Severely ill patients improved on drug and legal outcomes, but showed less improvement on psychiatric and family/social outcomes with extended durations of care.

In keeping with our results that severely ill patients improved on drug and legal outcomes, but showed less improvement on psychiatric and family/social outcomes with extended durations of care, psychotherapy research on dose-response relationships has found that reductions in targeted disorder-specific symptoms typically precede improvements in life functioning, including interpersonal adaptation (Barkham et al., 1996; Howard et al., 1993); these studies did not focus on interactions of patient severity by duration, however. Moggi and coworkers (1999) found that dual diagnosis patients with more severe psychiatric symptoms improved on substance-use measures to the exclusion of psychiatric symptoms, but they did not examine the interaction of patient severity or diagnosis by duration or intensity of treatment. They suggested that for severely ill dual diagnosis patients in particular, mental health programs that teach general coping skills (requiring the patient to take actions to resolve life stressors such as psychological dysfunction and conflicts with one's spouse, family, and friends) may be less effective than programs that teach substance-use-specific coping skills (requiring the patient to resist the temptation to use drugs, thereby reducing the risk of legal difficulties that frequently accompany substance use).

A study by Hoffman, DiRito, and McGill (1993) suggests that severely ill dual diagnosis patients can learn general coping skills when treatment programs are invested in teaching them. In that study, more severely ill dual diagnosis inpatients were treated in small, relaxed groups with a concrete educational approach to reducing maladaptive behavior and improving living skills and social skills. High-severity patients in specialized treatment, and less severely ill patients in standard treatment, were equivalent at 3 months post-discharge on substance use, employment, post-discharge treatment compliance, and legal- and family-problem outcomes.

Limitations and Conclusions

It is important that this study's findings be considered in light of its limitations. The project focused on a selected sample composed primarily of men with relatively few economic and social resources and with relatively chronic disorders. All the patients were obtaining services under the

auspices of one integrated public-sector health care system that operates under managed care principles (Humphreys, Huebsch, Moos, & Suchinsky, 1999). The findings need to be replicated among less chronic patients who have more economic and social resources and are receiving treatment from health care systems that are private or non-profit or that maintain separate agencies for substance abuse and psychiatric care.

We found that dual diagnosis patients with more severe symptoms did appear to receive inadequate "doses" of treatment in that they had a shorter duration of care and were less likely to receive outpatient substance abuse treatment than were patients with less severe symptoms, despite research evidence that longer episodes of specialized care and continuing outpatient treatment are beneficial to dual diagnosis patients. Dual diagnosis patients with highly severe symptoms would be likely to benefit from a longer episode of care that includes substance abuse and psychiatric outpatient treatment as part of the treatment package, in addition to any inpatient services that may be obtained. Twelve months of treatment may be sufficient for severely ill patients to show improvement close to that of milder patient groups on drug and legal outcomes. In keeping with this recommendation, Kopta, Howard, Lowry, and Beutler (1994), studying 800+ psychiatric patients, found that a typical client needed about 1 year of treatment to have a 75% chance of recovery from disorder-specific symptoms. However, moderately and severely ill patients may need care for a period even longer than 12 months to stabilize and rehabilitate problems related to their psychiatric and family functioning. The length of follow-up should be extended beyond that used here to examine how treatment patterns over a longer period of time explain outcomes in different domains among patients in different severity groups.

Because the consistency and duration of care bear stronger relationships to outcomes than does the amount or intensity of care (Fontana & Rosenheck, 1996; Moos et al., 2000), satisfying patients' needs with respect to extended durations of care need not unduly burden mental health programs and systems. That is, outpatient specialty services, for example, may be obtained by patients less frequently but over longer periods of time. In addition, there is growing evidence that self-help group participation during and after inpatient, residential, and outpatient treatment may facilitate dual diagnosis patients' maintenance of gains made during formal care (Kurtz et al., 1995; Meissen, Powell, Wituk, Girrens, & Arteaga, 1999; Ouimette et al., 1999; Ouimette, Finney, & Moos, in press; Pristach & Smith, 1999; Rychtarik, Connors, Dermen, & Stasiewicz, 2000). Ultimately, we need to identify the combinations of formal and informal care that optimize the functioning of dual diagnosis patients whose symptoms range from mildly to severely disabling.

REFERENCES

Alterman, A.I., & Cacciola, J.S. (1991). The antisocial personality disorder diagnosis in substance abusers: Problems and issues. *Journal of Nervous and Mental Disease, 179*, 401–409.

Alterman, A.I., McLellan, A.T., & Shifman, R.B. (1993). Do substance abuse patients with more psychopathology receive more treatment? *Journal of Nervous and Mental Disease, 181*, 576–582.

Barkham, M., Rees, A., Stiles, W.B., Shapiro, D.A., Hardy, G.E., & Reynolds, S. (1996). Dose-effect relations in time-limited psychotherapy for depression. *Journal of Consulting and Clinical Psychology, 64*, 927–935.

Brown, V.B., Melchior, L.A., & Huba, G.J. (1999). Level of burden among women diagnosed with severe mental illness and substance abuse. *Journal of Psychoactive Drugs, 31*, 31–40.

Drake, R.E., Mercer-McFadden, C., Mueser, K.T., McHugo, G.J., & Bond, G.R. (1998). Review of integrated mental health and substance abuse treatment for patients with dual disorders. *Schizophrenia Bulletin, 24*, 589–609.

Fontana, A., & Rosenheck, R. (1996). Improving the efficiency of outpatient treatment for posttraumatic stress disorders. *Administration and Policy in Mental Health, 23*, 197–210.

Gastfriend, D.R., & McLellan, A.T. (1997). Treatment matching: Theoretic basis and practical implications. *Medical Clinics of North America, 81*, 945–966.

Gerstley, L.J., Alterman, A.J., McLellan, A.T., & Woody, G.E. (1990). Antisocial personality disorder in patients with substance abuse disorders: A problematic diagnosis? *American Journal of Psychiatry, 147*, 173–178.

Gordon, R.E., & Gordon, K.K. (1987). Relating Axes IV and V of DSM-III to clinical severity of psychiatric disorders. *Canadian Journal of Psychiatry, 32*, 423–424.

Hoffman, G.W., DiRito, D.C., & McGill, E.C. (1993). Three-month follow-up of 28 dual diagnosis inpatients. *American Journal of Drug and Alcohol Abuse, 19*, 79–88.

Howard, K.I., Lueger, R.J., Maling, M.S., & Martinovich, Z. (1993). A phase model of psychotherapy outcome: Causal mediation of change. *Journal of Consulting and Clinical Psychology, 61*, 678–685.

Huff, E.D. (2000). Outpatient utilization patterns and quality outcomes after first acute episode of mental health hospitalization. *Evaluation and the Health Professions, 23*, 441–456.

Humphreys, K., Huebsch, P.D., Moos, R.H., & Suchinsky, R.T. (1999). The transformation of the Veterans Affairs substance abuse treatment system. *Psychiatric Services, 50*, 1399–1401.

Ito, J.R., & Donovan, D.M. (1990). Predicting drinking outcome: Demography, chronicity, coping, and aftercare. *Addictive Behavior, 15*, 553–559.

Kasprow, W.J., Rosenheck, R., Frisman, L., & DiLella, D. (1999). Residential treatment for dually diagnosed homeless veterans: A comparison of program types. *American Journal on Addictions, 8,* 34–43.

Kopta, S.M., Howard, K.I., Lowry, J.L., & Beutler, L.E. (1994). Patterns of symptomatic recovery in psychotherapy. *Journal of Consulting and Clinical Psychology, 62*, 1009–1016.

Kurtz, L.F., Garvin, C.D., Hill, E.M., Pollio, D., McPherson, S., & Powell, T.J. (1995). Involvement in Alcoholics Anonymous by persons with dual disorders. *Alcoholism Treatment Quarterly, 12*, 1–18.

Lehman, A.F., Myers, C.P., Johnson, J., & Dixon, L.B. (1995). Service needs and utilization for dual-diagnosis patients. *American Journal on Addictions, 4*, 163–169.

Luke, D.A., Mowbray, C.T., Klump, K., Herman, S.E., & BootsMiller, B. (1999). Exploring the diversity of dual diagnosis: Utility of cluster analysis for program planning. *Journal of Mental Health Administration, 23*, 298–316.

McKay, J.R., Alterman, A.I., McLellan, A.T., & Snider, E.C. (1994). Treatment goals, continuity of care, and outcome in a day hospital substance abuse rehabilitation program. *American Journal of Psychiatry, 151*, 254–259.

McLellan, A.T., Kushner, H., Metzger, D., Peters, R., Smith, I., Grissom, G., Pettinati, H., & Argeriou, M. (1992). The fifth edition of the Addiction Severity Index. *Journal of Substance Abuse Treatment, 9*, 461–480.

McLellan, A.T., Luborsky, L., Cacciola, J., Griffith, J., Evans, F., Barr, H.L., & O'Brien, C.P. (1985). New data from the Addiction Severity Index: Reliability and validity in three centers. *Journal of Nervous and Mental Disease, 173*, 412–423.

McLellan, A.T., Luborsky, L., Woody, G.E., & O'Brien, C.P. (1980). An improved diagnostic evaluation instrument for substance abuse patients: The Addiction Severity Index. *Journal of Nervous and Mental Disease, 168,* 26–33.

McLellan, A.T., Woody, G.E., Luborsky, L., O'Brien, C.P., & Druley, K.A. (1983). Increased effectiveness of substance abuse treatment: A prospective study of patient-treatment "matching." *Journal of Nervous and Mental Disease, 171*, 597–605.

Meissen, G., Powell, T.J., Wituk, S.A., Girrens, K., & Arteaga, S. (1999). Attitudes of AA contact persons toward group participation by persons with a mental illness. *Psychiatric Services, 50,* 1079–1081.

Moggi, F., Ouimette, P.C., Finney, J.W., & Moos, R.H. (1999). Effectiveness of treatment for substance abuse and dependence for dual diagnosis patients: A model of treatment factors associated with one-year outcomes. *Journal of Studies on Alcohol, 60*, 856–866.

Moos, R.H., Finney, J.W., Cannon, D., Finkelstein, A., McNicholas, L., McLellan, A.T., & Suchinsky, R. (1998). *Outcomes monitoring for substance abuse patients: I. Patients' characteristics and treatment at baseline*. Palo Alto, CA: Department of Veterans Affairs Health Care System.

Moos, R.H., Finney, J.W., Federman, E.B., & Suchinsky, R. (2000). Specialty mental health care improves patients' outcomes: Findings from a nationwide program to monitor the quality of care for patients with substance use disorders. *Journal of Studies on Alcohol, 61*, 704–713.

Moos, R.H., Humphreys, K., Ouimette, P.C., & Finney, J. (1999). Evaluating and improving VA substance abuse patients' care. *American Journal of Medical Quality, 14*, 45–54.

Moos, R.H., Schaefer, J., Andrassy, J., & Moos, B. (2001). Outpatient mental health care, self-help groups, and patients' one-year treatment outcomes. *Journal of Clinical Psychology, 57*, 273–287.

Ouimette, P.C., Finney, J.W., & Moos, R.H. (1997). Twelve-step and cognitive-behavioral treatment for substance abuse: A comparison of treatment effectiveness. *Journal of Consulting and Clinical Psychology, 65*, 230–240.

Ouimette, P.C., Finney, J.W., & Moos, R.H. (in press). Two year posttreatment functioning and coping of patients with substance use and posttraumatic stress disorder. *Psychology of Addictive Behavior*.

Ouimette, P.C., Gima, K., Moos, R.H., & Finney, J.W. (1999). A comparative evaluation of substance abuse treatment. IV. The effect of comorbid psychiatric diagnoses on amount of treatment, continuing care, and 1-year outcomes. *Alcoholism: Clinical and Experimental Research, 23*, 552–557.

Pristach, C.A., & Smith, C.M. (1999). Attitudes towards Alcoholics Anonymous by dually diagnosed psychiatric inpatients. *Journal of Addictive Diseases, 18*, 69–76.

Rabinowitz, J., Massad, A., & Finnig, S. (1995). Factors influencing disposition decisions for patients seen in a psychiatric emergency service. *Psychiatric Services, 46*, 712–718.

Rabinowitz, J., Slyuzberg, M., Salamon, I., Dupler, S., Kennedy, R.S., & Steinmuller, R. (1995). A method for understanding admission decision making in a psychiatric emergency room. *Psychiatric Services, 46*, 1055–1060.

Rounsaville, B.J., Kosten, T.R., Weissman, M.M., & Kleber, H.D. (1986). Prognostic significance of psychopathology in treated opiate addicts. *Archives of General Psychiatry, 43,* 739–745.

Rychtarik, R.G., Connors, G.J., Dermen, K.H., & Stasiewicz, P.R. (2000). Alcoholics Anonymous and the use of medications to prevent relapse: An anonymous survey of member attitudes. *Journal of Studies on Alcohol, 61*, 134–138.

Stoffelmayr, B.E., Mavis, B.E., & Kasim, R.M. (1994). The longitudinal stability of the Addiction Severity Index. *Journal of Substance Abuse Treatment, 11*, 373–378.

Tucker, L., Bauer, S.F., Wagner, S., Harlam, D., & Sher, I. (1987). Long-term hospital treatment of borderline patients: A descriptive outcome study. *American Journal of Psychiatry, 144*, 1443–1448.

Turner, W.M., Turner, K.H., Reif, S., Gutowski, W.E., Gastfriend, D.R. (1999). Feasibility of multidimensional substance abuse treatment matching. *Drug and Alcohol Dependence, 55*, 35–43.